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CS 210

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Project Two - Banking App Pseudocode

Subroutine: printDetails

Purpose: Print the year, year-end balance, and interest earned

with specific formatting (two tabs between fields).

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FUNCTION printDetails(year, yearEndBalance, interestEarned)

// Format the output as:

// <year> [tab][tab] "$" <yearEndBalance formatted to 2 decimals> [tab][tab] "$" <interestEarned formatted to 2 decimals>

PRINT year, TAB, TAB, "$", FORMAT(yearEndBalance, 2 decimals), TAB, TAB, "$", FORMAT(interestEarned, 2 decimals)

END FUNCTION

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Function: calculateBalanceWithoutMonthlyDeposit

Purpose: Calculate the final investment balance after a given

number of years with monthly compounding and NO additional

monthly deposits.

Parameters:

initialInvestment - the starting amount

interestRate - the annual interest rate (in percent)

numberOfYears - the total number of years for the calculation

Process:

- Set the number of months in a year to 12.

- Initialize balance with the initial investment.

- For each year from 1 to numberOfYears:

- Reset the accumulator for interest earned during that year.

- For each month from 1 to 12:

- Compute monthly interest as: balance \* (interestRate / 100 / 12)

- Add the monthly interest to the balance.

- Accumulate the monthly interest into the year's total interest.

- After 12 months, call printDetails with the current year,

the updated balance, and the interest earned during that year.

- Return the final balance.

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FUNCTION calculateBalanceWithoutMonthlyDeposit(initialInvestment, interestRate, numberOfYears)

SET monthsInYear = 12

SET balance = initialInvestment

FOR year FROM 1 TO numberOfYears DO

SET interestEarnedYear = 0.0

FOR month FROM 1 TO monthsInYear DO

SET monthlyInterest = balance \* (interestRate / 100.0 / monthsInYear)

SET balance = balance + monthlyInterest

SET interestEarnedYear = interestEarnedYear + monthlyInterest

END FOR

CALL printDetails(year, balance, interestEarnedYear)

END FOR

RETURN balance

END FUNCTION

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Function: balanceWithMonthlyDeposit

Purpose: Calculate the final investment balance after a given

number of years with monthly compounding and an additional

monthly deposit.

Parameters:

initialInvestment - the starting amount

monthlyDeposit - the fixed deposit added each month

interestRate - the annual interest rate (in percent)

numberOfYears - the total number of years for the calculation

Process:

- Set the number of months in a year to 12.

- Initialize balance with the initial investment.

- For each year from 1 to numberOfYears:

- Reset the accumulator for interest earned during that year.

- For each month from 1 to 12:

- Compute monthly interest as: balance \* (interestRate / 100 / 12)

- Add the monthly interest to the balance.

- Accumulate this interest in the year's total interest.

- Then add the monthly deposit to the balance (which will earn interest starting next month).

- After processing all 12 months, call printDetails with the current year,

the updated balance, and the interest earned during that year.

- Return the final balance.

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FUNCTION balanceWithMonthlyDeposit(initialInvestment, monthlyDeposit, interestRate, numberOfYears)

SET monthsInYear = 12

SET balance = initialInvestment

FOR year FROM 1 TO numberOfYears DO

SET interestEarnedYear = 0.0

FOR month FROM 1 TO monthsInYear DO

SET monthlyInterest = balance \* (interestRate / 100.0 / monthsInYear)

SET balance = balance + monthlyInterest

SET interestEarnedYear = interestEarnedYear + monthlyInterest

SET balance = balance + monthlyDeposit

END FOR

CALL printDetails(year, balance, interestEarnedYear)

END FOR

RETURN balance

END FUNCTION

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Main Program Flow

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BEGIN MAIN

// Prompt the user for input values

PRINT "Enter initial investment amount: "

READ initialInvestment

PRINT "Enter annual interest rate (in %): "

READ interestRate

PRINT "Enter number of years: "

READ numberOfYears

PRINT "Enter monthly deposit amount: "

READ monthlyDeposit

// Calculate and display results without monthly deposits

PRINT "\n--- Calculating balance WITHOUT monthly deposits ---"

SET finalBalanceWithout = CALL calculateBalanceWithoutMonthlyDeposit(initialInvestment, interestRate, numberOfYears)

PRINT "\nFinal balance without monthly deposits: $", FORMAT(finalBalanceWithout, 2 decimals)

// Calculate and display results with monthly deposits

PRINT "\n--- Calculating balance WITH monthly deposits ---"

SET finalBalanceWith = CALL balanceWithMonthlyDeposit(initialInvestment, monthlyDeposit, interestRate, numberOfYears)

PRINT "\nFinal balance with monthly deposits: $", FORMAT(finalBalanceWith, 2 decimals)

END MAIN